ORIGINS

• Journal of the Biblical Creation Society •

Volume 3 Number 7

in this issue:

Dinosaurs – Designer Made?

Man in the Image of God

Religious Presuppositions in Historical Geology

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Writing for Origins

Origins is looking for talented new writers, particularly those who have had expertise in a specialized field of science or theology, in relation to creation, and who are in agreement with the aims and basis of the BCS. In addition writers in a popular vein are needed, but accuracy and solid content are still essential. Any manuscripts for consideration should ideally be typed, double-spaced and sent to the Editor. News items that may be of interest are also sought. We are now also able to receive manuscripts submitted on disk, Amstrad 3" format; disks would be returned after transfer of the file.

Editorial Policy

Whilst **Origins** exists to further the aims of the Biblical Creation Society, opinions expressed in articles and signed editorials are not necessarily shared by either the Editorial Committee or the Society.

Credits

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Editorial

When someone labours for the sake of the Gospel it is easy to forget to thank them, or show gratitude in some practical way. Thus the BCS committee would like to thank Mike Matthews for bringing **Origins** into existence, and setting such a high standard in the first two volumes. More tangibly, we have given him a sabbatical. This issue is the responsibility of a sub-committee, as are the next two, which will complete Volume 3. Please pray for us, that we maintain the quality of the journal, and also for Mike, that he should be thoroughly refreshed by the break.

The famous fossil-hunter Othniel Charles Marsh first described a creature called Brontosaurus from a skeleton that he had discovered back at the turn of the century. However, in 1979 Berman and McIntosh, two researchers at America's Carnegie Institute, brought to light the fact that he had given it the wrong head. His skeleton had the skull missing, and so he used one found a few miles away. In 1909 Earl Douglas dug up a skeleton in Utah, complete with a much sleeker skull. This discovery was published by W. J. Holland in 1915, but by then museums had copies of the original composite skeleton, and the Brontosaurus was popularised. In accurate, recent volumes the skeletons with the correct head are known as Apatosaurus, and the Brontosaurus is no longer listed. With all the enthusiasm for, and commercialisation of dinosaurs nowadays, it is difficult to discern the solid data about them, within the popular myths. Dr. Nancy Darrall's article, 'Dinosaurs – Designer Made?', contrasts their true specialised designs with the myth that they must, by their supposed antiquity, have been crude and primitive.

The Creation Manifesto published in **Origins** 2:5 was structured under topics and sub-topics in order to make it easy to use as a reference document. Some might find the numbering system a little daunting, but it will be useful in exchanging ideas as to future refinements and additions. Within '1. The Scriptural Doctrine of Creation' there is '1.3 The Creation and Nature of Man'. Amongst these teachings, section 1.3.2 refers to the profound statement that we are 'Made in the Image of God'. The three concise paragraphs that follow have provided the seeds for 'Man in the Image of God', by Dr. John Peet. This is exactly the sort of fruit that we hoped for from the Manifesto, and pray that many more authors will be similarly inspired to submit to **Origins**.

It has been indicated that an issue would be devoted to the subject of the age of the Earth. The sub-committee has decided that such an important subject would be better served by giving it more space, and time for reflection. Thus we are planning to have at least one article pertinent to the subject in each of the three issues that we are producing. We trust that this will continue into the next volume if authors and correspondents are stimulated to put pen to paper by what they read. As with dinosaurs there are some deep rooted myths about historical geology. David Tyler illustrates this very well in 'Religious Presuppositions in Historical Geology'.

Somewhere in the handover of paperwork to the new production team an article became separated from its accompanying letter. Could the author of 'The Fall, Creation, and the Theory of Evolution' please write to us at P.O. Box 22, and let us know who and where you are.

● ●

News of Creation

Tapes from Nottingham Conference 1988

The cassettes available are:-

Plenary Sessions in order of presentation.

David Tyler – *Adam and Early Man*
Dr. Nancy Darrall and Sheena Eisaks – *Eve and Cell Biology. (Mitochondrial DNA)*
Dr. David Watts – *The Development of Language*
Prof. Edgar Andrews – *Biblical v. Scientific Creationism*

Seminars

Sylvia Baker – *The Blind Watchmaker & the Eye*
Mike Matthews – *Faith, Evolution & Creation*
Peter Senior – *The Anthropic Principle*

The tapes are £2.50 each inc. p. & p. Please order through P. O. Box 22, RUGBY, CV22 7SY.

Day Conference in Surrey, January 1990

The BCS will be running a day conference (10.30 – 4.30) at Hook Evangelical Church, Surbiton, Surrey, on Saturday the 27th of January. There will be three main speakers.

Rev. Jonathan Stephen – *A Biblical Look at Early Civilisations*
Dr. Nancy Darrall – *Human Biology and Evolution*
David Tyler – *Early Man*

A number of seminars will also be arranged.

Car parking will be in a nearby school. Light refreshments will be available, but please bring your own lunch. Please write to P.O. Box 22, RUGBY, CV22 7SY for more information and a map showing how to find the church.

Dinosaurs – Designer Made?

Nancy Darrall

To most of us, dinosaurs hold the same fascination as does a bull-nosed Morris to a car fanatic. Large, slow-moving and obsolete, now only to be found in museums. However, unlike these old cars, we do not really know what dinosaurs looked like or how fast they moved. Nor do we know for certain what many of them ate or why they were suddenly wiped out across the whole world.

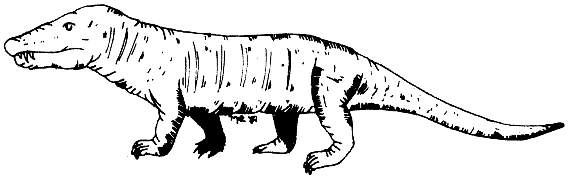
Dinosaurs in the Bible?

We have a description of two terrifying animals in Job 40 and 41. Were either of them dinosaurs? We do not know for sure, but certainly the description of behemoth, with great strength in its thighs and body, a tail like a cedar and bones like tubes of bronze more nearly fits an *Iguanodon* or a *Brachiosaurus* than a present-day mammal such as a hippopotamus or a rhinoceros.

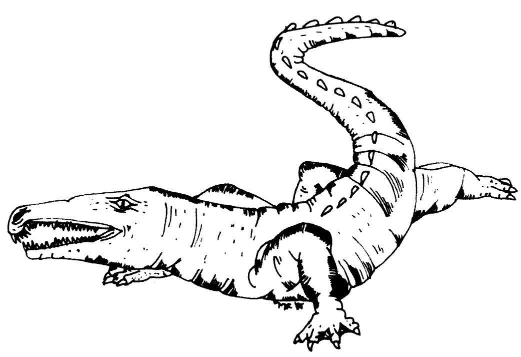
The Bible teaches that men and dinosaurs did walk the earth at the same time. Genesis 1 tells us that God finished His creative works at the end of the sixth day. No new kinds were subsequently designed and created. Adam was then given the task of naming all the animals living on the land and also the birds (Genesis 2:19). This must have included naming each kind of dinosaur and subsequently living in a world inhabited by these creatures, as well as by other animals whose descendants can still be found living today. At this time each plant and animal would have been perfectly adapted to the environment in which it was created to live. However, after Adam and Eve had rebelled against God and sin entered the world, changes occurred in the natural world (Genesis 3:17; Romans 8:19–20). A few details are given in Scripture: the ground became less productive and agricultural weeds, such as thorns and thistles, appeared. Subsequently, the worldwide flood in the time of Noah would have had enormous impact on the plant and animal life and also on the appearance of the world, with repercussions in the years that followed. As an aside, it is interesting to note that writers and illustrators, almost without exception, omit to include dinosaurs amongst the animals in the ark. This error needs to be remedied! The fossil record of both plants and animals shows us that many species have become extinct since the time of the flood and this includes the dinosaurs.

What Can Fossil Dinosaurs Tell Us?

Evidence for the existence of dinosaurs comes from finds of fossilised bones in the rocks of the Triassic, Jurassic and Cretaceous formations. The enormous bones that were discovered in these rocks were first thought to be the bones of giant men. In the mid 19th century, by which time many different bones and some almost complete skeletons had been found, the name Dinosauria or terrible lizard was given to these large animals. In most cases, all that is left are the fossilised bones, but these can tell us much about the appearance of these animals when they were alive. By comparing the shape and size of these bones, including the areas for muscle attachment, with those of reptiles alive today, a good indication of the likely size and shape can be obtained. The probable length of their stride and speed at which they moved can also be estimated. Further, the shape of the teeth and areas of wear on them provide a good indication of whether the animal was a carnivore, tearing flesh from its prey, or a plant eater, biting off plant material with its front teeth and grinding it down on the back teeth. In a few cases, impressions of the skin have been found or remains of flesh and skin in a mummified form as in the case of a hadrosaur where its stomach contents revealed a diet of pine tree shoots. However, when only parts of the fossilised skeleton remain, there can be insufficient information for a correct identification of the dinosaur to be made. This happened in 1976 when the skull of a marine reptile, *Mosasaurus* found in Mikasa City, Hokkaido, was thought to be that of *Tyrannosaurus* by a member of staff at the Natural Science Museum in Japan. The mistake was duly rectified, but in the meantime a thriving tourist trade had been built up around the supposed find of *Tyrannosaurus,* including a huge concrete replica and an accompanying souvenir trade (Anderson, 1989). Such is the popularity of the tourist attraction that the city is loathe to take it away. A number of mistaken conclusions can be found in books on dinosaurs and are unfortunately repeated by others. As in any scientific field, more is being found out and previous mistakes are being corrected. We should not regard any scientific statement as 100% correct for all time and situations.



a) Mammal-like reptile *Cynognathus*



b) Thecodont *Chasmatosaurus*

Fig. 1 a) & b)

The dinosaurs were very different from those land vertebrates whose fossils can be found in earlier sedimentary rocks: the amphibians, reptiles (Cotylosaurs) and the mammal-like reptiles (Synapsids). These earlier types had changed little since their appearance in the fossil record in the Carboniferous and Permian formations. There was an enormous array of different species, both herbivorous and carnivorous, nearly all of them land-dwelling four-footed sprawlers (Fig 1). However, none had the distinctive defensive weapons, protective shell or offensive claws and teeth of the dinosaurs. In the dinosaurs we find a group of animals quite different from those found in earlier rock formations. These new and complex features to be found in the dinosaurs appear with no evidence of evolution in the form of fossilised intermediates. A multitude of genes would need to have arisen to code for these new characteristics and in an evolutionary scheme a long period of time would be necessary for this to occur. It is difficult to conceive, from a biological point of view, how these complex characteristics could have appeared without intermediate forms.

Dinosaurs Came in Many Shapes and Sizes

At peak diversity, there were 16 orders of reptiles. Three are still flourishing today, the turtles, the lizards and snakes and the crocodiles. *Tuatara* is a single species of another order living on islands off the coast of New Zealand. These orders have remained virtually unchanged since the time when the dinosaurs flourished, although some of the larger forms have become extinct. One crocodile rivalled *Tyrannosaurus* in size at 13.7 metres long, with the skull alone 1.9 metres long. This is one of many examples of the preservation of groups of animals over long periods, and provides evidence that the natural world does indeed reproduce "after its kind" (Genesis 1). The dinosaurs, with their specialised adaptations are considered to be more advanced, in evolutionary terms, than the members of these other four groups. However, it is these four which can still be found today. The evolutionist is therefore forced to set aside these highly specialised animals, the dinosaurs, as an evolutionary "dead end," a mistake. I would suggest that this view is not compatible with a belief in the perfect creation of God that we read about in Genesis 1 and 2.

The dinosaurs consist of two different groups of reptiles, the Saurischia, and the Ornithiscia. A diagram outlining the classification of these groups is shown in Fig 2 and descriptions of some of the better known species follow. As we have a look at various examples of this diverse and highly specialised group of animals, we need to ask two questions. Firstly, do they represent a group that evolved from more primitive species and have now been superseded by more advanced forms? Secondly, were they a group that were clearly designed to be well adapted to their environment? In other words, do the scientific facts currently available more closely fit the evolutionary model or the Biblical account?

Dinosaurs Show Complex Design Features

The Theropod dinosaurs would have been an easily distinguished group (Fig 3). They moved around on their back legs most of the time and with a few exceptions they were carnivorous. Within the group they are classified by

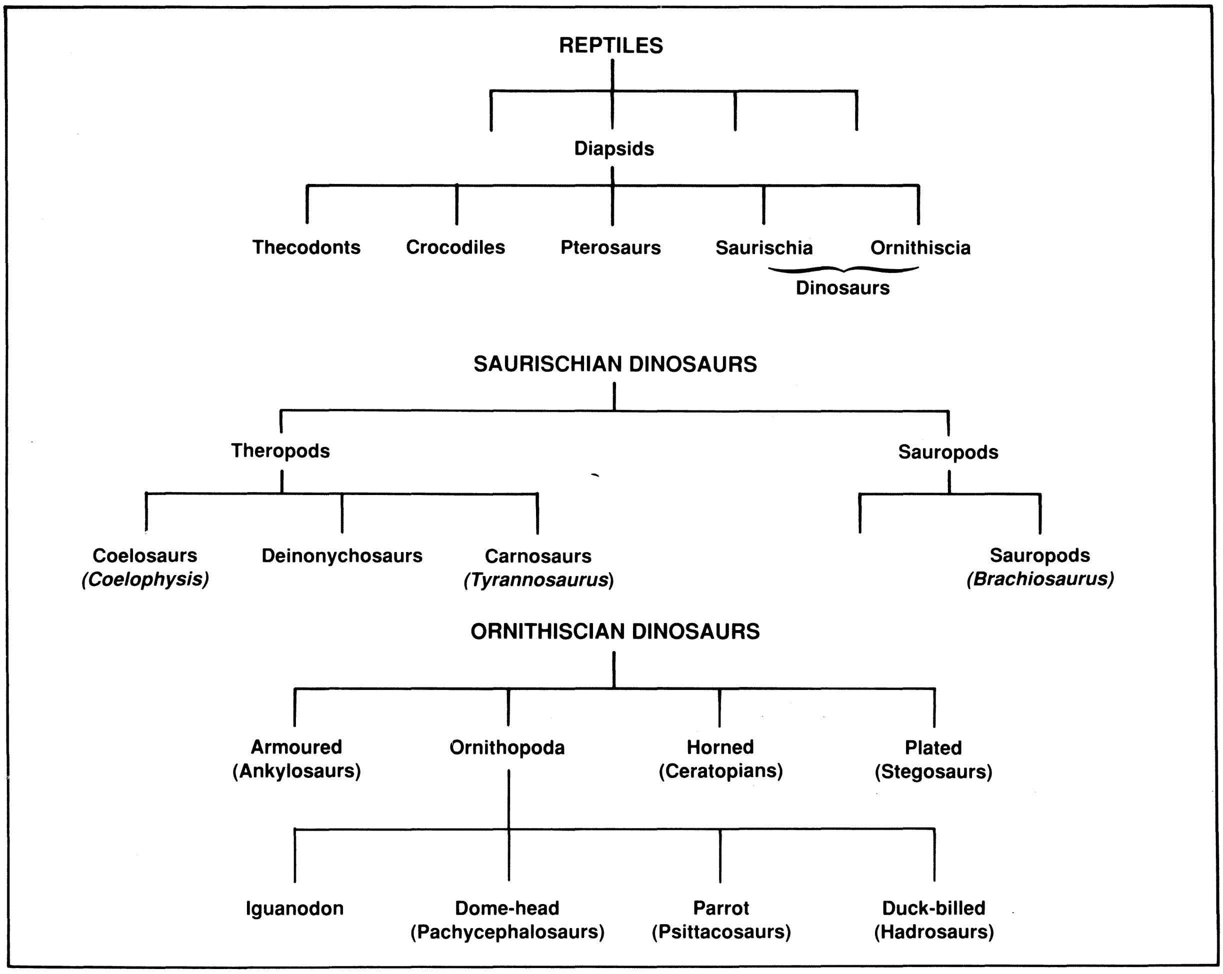


Fig 2 The Reptile Family Tree

size. The Coelosaurs were the smallest and most lightly built. Many well preserved skeletons of *Coelophysis* have been found in New Mexico, from newly hatched babies to fully grown adults which were about 2.5m long and 1m tall when standing upright. This dinosaur had feet rather like those of a bird and ran on tiptoe with only three toes reaching the ground. It had a long stride compared with its size and was probably a fast runner, catching small animals, such as insects, but probably also taking eggs and fruit in its simple sharp teeth. Another well-known species is *Struthiomimus,* one of the so-called bird mimics, which was possibly the fastest land animal ever to have lived. The long legs and specialised feet are reminiscent of birds and they caught their prey in beaks which had no teeth. Their eyes were huge, possibly the largest known among vertebrates and they had a very wide angle of vision. Others, such as *Dromaeosaurus,* had stereoscopic vision and grasping fingers with opposable thumbs. Their brains were relatively large for dinosaurs, similar to those of modern reptiles and presumably they were highly intelligent. These animals were clearly no evolutionary backwater but a highly specialised group with many complex features designed to enable them to successfully colonise their own particular environment. The largest of the Theropods, the Carnosaurs, include *Allosaurus* and *Tyrannosaurus rex.* Their teeth had the saw-toothed edges typical of meat-eating animals and some teeth in *Tyrannosaurus* could be 15 cm in length. This group were more heavily built than other Theropods, with shorter necks and larger heads. *Tyrannosaurus* is generally believed to have been the largest flesh-eating animal that ever walked the earth at 12 m long, 5 m tall and weighing about 7 tonnes, but it probably moved quite slowly as its stride was little more than 1 m in length. The head alone was 1.25 m long and the immensely powerful hind legs bore great clawed feet that were well-suited for tearing apart its prey (Fig 4). It has been suggested that they hunted in packs, picking off the weakest in herds of Sauropods.

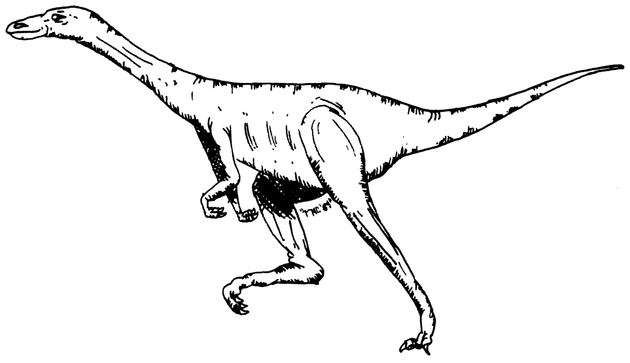


Fig. 3 Theropod Dinosaur *Coelophysis*

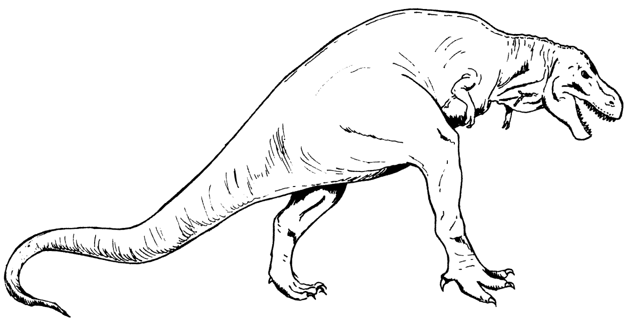


Fig. 4 *Tyrannosaurus*

The Sauropods (Fig 5) were quite different from the Theropods. They moved around on four legs and ate only plant material, which probably consisted largely of conifers. The animals in this group were all very similar, with enormous bodies, long necks and an even longer tail. The head was small and had small peg-like teeth. Their teeth often show signs of being well-worn and the many smooth stones which have been found around the skeletons were probably gastroliths, pebbles which helped to grind down the food in the stomach to aid digestion. These enormous creatures appear first in the fossil record in Jurassic strata, but they can also be found in the more recent Cretaceous deposits. However, it is in the earlier, Jurassic strata that they are at their most diverse. There are no generally accepted ancestors of dinosaurs in earlier deposits to fit into an evolutionary scheme of origins. This problem in the theory of evolution is particularly acute because of the need to account for the wide diversity of Sauropods found in the oldest rocks that contain fossils of dinosaurs. The group includes *Apatosaurus, Diplodocus* and *Brachiosaurus* and the size of these creatures seems

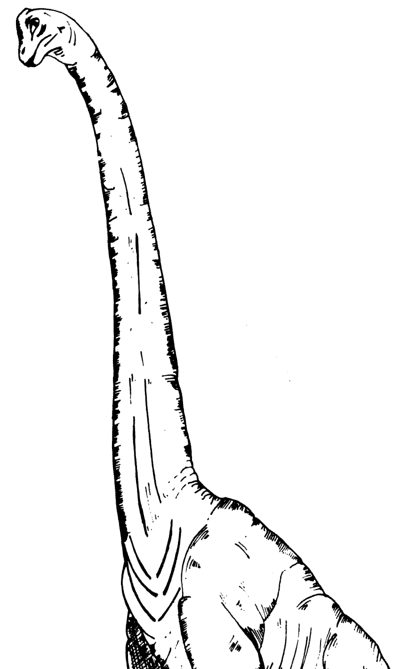


Fig. 5 Sauropod Dinosaur *Brachiosaurus*

almost incredible. *Brachiosaurus* approached the theoretical limit for the size of a land animal and some isolated bones may represent individuals of up to 90 tonnes. *Apatosaurus* had a small head separated from the body by a long neck of 12-15 hollow vertebrae. A cable ligament ran the length of the neck to lift the head high and extra articulations allowed a wide range of movement despite the large distance between the head and the base of the neck. Here we see a number of features which together enabled the animal to function effectively by combining strength with agility. This is a good example of design in creation, as all these features are fully in place in the earliest fossils of this type and all are necessary for such a large animal to survive. Their four legs were like straight pillars, similar to the legs of an elephant, only altogether bigger. The length of the stride has been measured as 2-4 m from fossil footprints, so they could have moved with some speed. They probably travelled around in herds and grazed on shoots of conifers such as ponderosa pine, Douglas fir and sequoias. The rib cage of these animals is deep, typical of a land animal such as an elephant, rather than the barrel shape of amphibians. It is unlikely that these animals spent extended periods of time in the water as suggested by some, because they would not have been able to breathe against the weight of water.

The second major group, the Ornithiscian dinosaurs, were all herbivorous and contained individuals with some very specialised features. Some consider these animals to be more advanced than present day mammals. Distinctive features include the shape of the pubis, one of the hip bones, which was more like that of birds than of other reptiles. They also had a separate bone in the jaw, the predentary, that formed the chin. Another feature was a lattice work of bony tendons which linked the neural spines of the backbone to provide extra support and allow the tail to be held out horizontally to balance the upper body during running. *Iguanodon,* the first dinosaur to be named, belonged to this group. It was more than 9 m long and stood 5 m tall and had rows of teeth that were constantly being replaced as they were worn down by the grinding of the coarse plant material that formed their diet. *Anatosaurus,* one of the duck-billed dinosaurs, the Hadrosaurs (Fig 6), had hundreds of sharp grinding teeth in rows at the back of its mouth which were also constantly being replaced. In common with most Ornithiscian dinosaurs, it had a complex hinging mechanism in the upper jaw which, together with the cheek muscles, provided a shearing power to maintain pressure for grinding between the upper and lower jaws. These muscles allowed the inside surface of the upper teeth to grind against the outside surface of the lower teeth as the upper and lower jaws closed together (Norman and Weishampel, 1987). It is difficult to accept an evolutionary origin for the different characteristics that go to make up this very efficient method of pulverising tough plant material. All the various features would have had to evolve simultaneously for the jaw to work efficiently and the probability of this occurring is so remote that it lies outside the realm of science. A great number of Hadrosaur fossils have been found, all very similar, except that they differed from one another in the shape of the skull. They appear to have been upland grazers on silica-rich fibrous plant material (grass is an example of such vegetation today). They could walk on four legs during grazing, but were well adapted to run on two legs as they had powerful leg muscles and they also possessed hooves which gave maximum bite on the ground during movement. All had large eyes providing good vision at a wide angle. Many had elaborate protuberances whose function is unknown. One possibility is that they were sound resonators allowing communication between individuals of a species. It has also been suggested that they enhanced the detection of smells or that they were used for combat and in ritual displays.

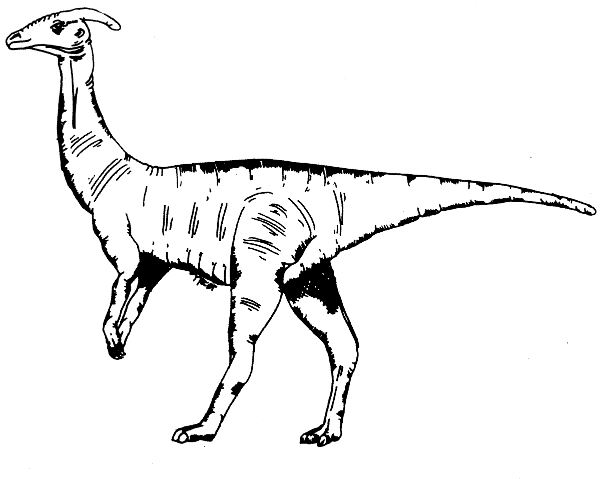


Fig. 6 Duck-billed Dinosaur *Parasaurolophus*

Other groups show unique specialised features. *Pachycephalosaurus,* the 'thick head lizards' are so named because of their thick-skulled, dome-shaped heads which were about 60 cm long. *Psittacosaurus,* the 'parrot' dinosaur had powerful jaws of up to 2.5 m in length whose shape was reminiscent of the shape of the beak of a parrot.

Three other groups of Ornithiscian dinosaurs all possessed distinctive defensive bony structures and moved on four legs (Fig 7), the horned (Ceratopia), the plated (Stegosauria) and the armoured dinosaurs (Ankylosauria). *Triceratops* and *Protoceratops* are both classified as horned dinosaurs, although *Protoceratops* had no horns. *Triceratops,* with three forward pointing horns was one of the largest of the horned dinosaurs. The skull of both species was enormous and extended back over the neck to provide a large surface area for the attachment of muscles. It has been estimated that the mass of muscle around the neck and jaws of *Protoceratops* was adequate to chew solid wood. Inside the mouth were several hundred cheek teeth for grinding up plant material. Another major group, the armoured dinosaurs (Ankylosaurs) could be considered to be the reptilian equivalent of a modern military tank. On the back of the body were thick oval plates of bone set in a leathery skin and in addition there was a bony club on the tail.

Dinosaurs – Small Beginnings

Examples of dinosaurs eggs that have been found are large, not surprisingly, but not in proportion to the size of the adult. The largest eggs which have been found are those of a Cretaceous Sauropod and they measure only 30.5 and 20.5 cm, probably the maximum size any egg could be. The size of the eggs would have been limited by the need for enough air to enter the porous egg shell and reach the embryo. This limits the thickness of the shell, which in turn limits the size of the egg that can be enclosed. It is probably for this reason that the largest dinosaur eggs were oval and somewhat flattened as this would have spread their weight on the ground. Here again we see evidence of design, with a large egg size because of the large final size of the adult, yet not too large to prevent the necessary events of hatching and air exchange taking place. Evidence for nests and the care of the young come from deposits containing Hadrosaur skeletons in Montana. Here skeletons of 15 immature dinosaurs only 1 m long were found in an oval nest-like structure alongside broken eggshells. The wear on the teeth of these youngsters indicates that they had been feeding for some time, which points to a period of parental care.

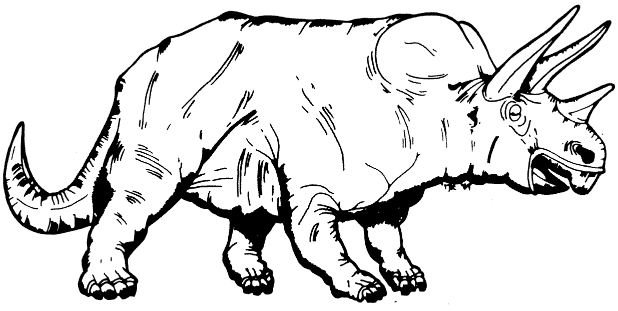


Fig. 7a Horned Dinosaur *Triceratops*

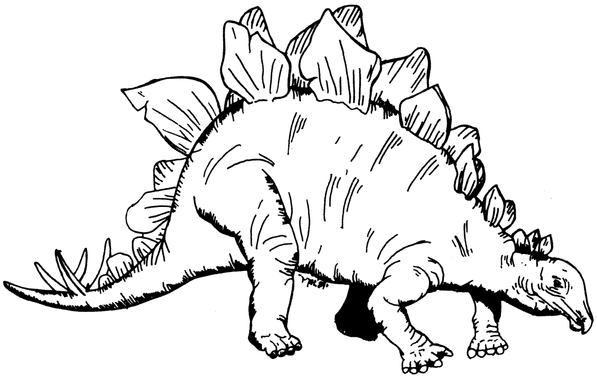


Fig. 7b Plated Dinosaur *Stegosaurus*

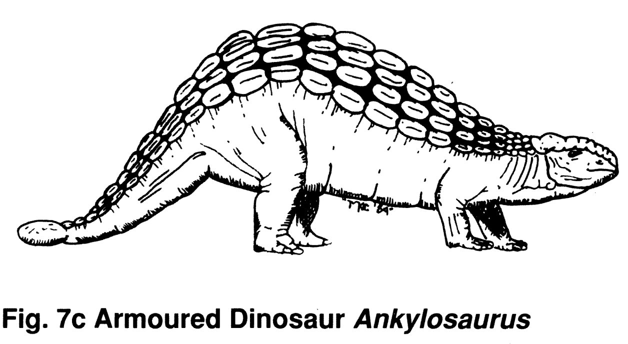


Fig. 7c Armoured Dinosaur *Ankylosaurus*

Dinosaurs – Not Misfits, but Well Adapted to a Variety of Life Styles

As can be seen from these descriptions of dinosaurs, they were animals that lived in a variety of environments. Each was well-adapted to a particular environment; this can be seen in the range of features appropriate for a particular environment that can be found in an individual species. Similar adaptations can be found in mammals today. The Hadrosaurs were very efficient grazing or browsing animals. Present day equivalents of these fast-moving, grazing animals would be deer, antelope and gazelles, whilst the Sauropod browsers would be represented by the rather smaller mammals, elephants and giraffe. Other dinosaurs were very efficient carnivores, moving quickly with a long stride that enabled them to catch their prey and sharp, pointed teeth for holding and tearing. Such adaptations are now found in mammals such as lions, tigers, bears and cheetahs. Smaller carnivores, the Coelosaurs, are represented now by wild dogs and wolves (Cloudsley-Thompson, 1984).

Why Extinction?

It is clear that dinosaurs were not only highly specialised and adapted to the various ecological niches in which they lived, but they also had, at least in some cases, well-developed social behaviour within herds or colonies. The most perplexing question is why did this very successful and diverse group become extinct? Many theories have been put forward and these centre around changes in climate, either an increase or decrease in annual temperature, or an increase in seasonal variation. It is possible that summer temperatures may have increased so much that these animals were unable to keep their bodies sufficiently cool to survive. A number of possible reasons for such a change of climate at this time have been put forward, including the impact of an asteroid. If this was the case, then a sudden change in climate could be anticipated, as all the debris thrown into the air would have obscured the sun causing a long, dark winter. Alternatively, an increase in volcanic activity may have had similar detrimental effects on the climate by producing volcanic dust which obscured the sun. Alternatively, the extensive movements of the continents, thought to have occurred at this time, could have been responsible for climatic change by causing alterations in the circulation of water in the oceans. If one of these events did cause a sudden change in climate, a catastrophic mass extinction of all animals unable to tolerate the change would have occurred. When considering the possible effects of climate on the dinosaurs, it must be remembered that other groups, notably the four remaining reptile groups, but also mammals, survived and many flourish today.

A recent controversial discovery is that of dinosaur bones mixed with those of animals similar to present day horses, cows and sheep (Anderson, 1986). This provides evidence to support the view that mammals lived at the same time as dinosaurs. This evidence, along with that from other parts of the USA (Sloan et al, 1986) indicates that dinosaurs lived alongside mammals and the former gradually became extinct. It has been suggested that small

(continued on Page 12)

Man – The Image of God

J. H. John Peet

The Biblical Creation Society manifesto highlights the Biblical perspective of man as "created in the image of God." What is meant by this? What are its implications?

A. The Scriptural statements on the "Imago Dei"

A.1 References to the Image

Let us consider some of the basic references, though others will be considered throughout the paper. On the sixth day of creation, God says "Let us make man in our image, after our likeness" (Genesis 1:26-27). This is a deliberate act, distinct from the rest of creation. Man was to reflect the Godhead. This is reiterated in the summary statement of Genesis 5:1-2. Mankind, male and female, was made in His image.

Paul tells us that God has pre-ordained that those He loves shall be conformed to the image of His dear Son (Romans 8:29). The blemishes, of which we shall speak, will be eradicated as we are perfected.

There is an important use of parallel words in Romans 8:3 (that Christ came in the likeness of sinful man) and those of Genesis 1:26. Just as Christ was **not** a sinful man, so we are not God. Our interpretation of this doctrine must reflect this constraint.

We must also note that Christ Himself is described as "the image of the invisible God." (Colossians 1:15) Indeed, Christ said, "He who has seen Me has seen the Father also." (John 14:9) As the Perfect Man, Christ showed clearly what God Himself is like (2 Corinthians 4:4). So, though different from Christ, we, as those created in the image of God, must be displaying something of the nature of God.

A.2 A Description of that Image

The word "image" comes from the Greek *eiko*, to be like. A unique word, used in Hebrews 1:3, is *charakter* (from which we get our word 'character') and means 'impressed character.' A number of attempts have been made to define this concept. Kitwood (p. 95) says, "He bears a reproduction of some of God's characteristics."

The Biblical view of man is that he is not an animal, and is apart from the animal kingdom. Though his physiological aspects may be similar to the animals', he is not an animal (cf. 1 Corinthians 15:39). Such a statement is fundamental to our interpretation of man.

Man's uniqueness in creation is frequently underlined in Scripture. The Psalmist marvelled at nature and said, in the light of that, "What is man, that Thou dost take thought of him?" (Psalm 8:4). The Lord Jesus draws attention to the Father's special care of us as against the animal kingdom (Matthew 6:26; 10:31).

The concept of man being in God's image has been summarised as everything that makes man different from animals. Man is created distinctively, separately and is distinguished from the rest of the created order.

Machen (p. 145) believes that the concept ". . . cannot . . . refer to man's body, because God is a spirit, it must therefore refer to man's soul." But, can man be so easily dissected? Significantly, in condemning murder, God tells Noah that it is because "in the image of God, He made man" (Gen. 9:6). Berkhof says (p. 205) that "We need not look for the image in the material substance of the body; it is found rather in the body as the fit instrument for the self-expression of the soul." The body and its faculties and the invisible aspects of man are vehicles to demonstrate our likeness to God. The physical body is to be recreated as a spiritual body.

Calvin explained, "By this term . . . is denoted the integrity with which Adam was endued when his intellect was clear, his affections subordinated to reason, all his senses duly regulated and when he truly ascribed all his excellence to the admirable gifts of his Maker. And though the primary seat of the divine image was in the mind and the heart, or in the soul and its powers, there was no part even of his body in which some rays of glory did not shine" (I, 15:3).

Berkhof quotes an eighteenth century Dutch theologian (p. 207), Witsius, who wrote, "The image of God consisted *antecedenter*, in man's spiritual and immortal nature; *formaliter*, in his holiness; *consequenter*, in his dominion." Contrasting man to the animals, Henry (p. 89) says, "Man is . . . superior to all other creatures . . . by virtue of his ability to know and love his Creator. This . . . is the *imago Dei*." Our human-ness is the image of God.

In summary, it means that, in contrast to the animal kingdom, we are persons. (Macaulay and Barrs, p.14). God created us to reflect His nature, just as Christ did in His incarnation. By His physical actions, such as touching the infectious, weeping with the bereaved, etc., He showed the nature of God.

Can people see God in us?

A.3 The Limitations of the Image

As we have already seen, this concept of man being made in the image of God does not imply identity with Him. Man is made finite, so there are incommunicable attributes of God, e.g. His eternity, His omnipresence, etc. Man is a finite reflection of the infinite personal God. Man's character, so defined, is dependent, as shown by creation, the Fall, redemption, etc. God's character is independent; it is synonymous with Godship.

In man, God becomes visible. (Hoekema, p. 67) "He is the image of God in the fact that he is man." To be "in the image of God" is to be "human." This image is dynamic, not static; it is active, not passive. We are not a museum piece, but a living example (cf. Romans 12:1-2).

A.4 The Perversion of the Image

The effect of the Fall (Genesis 3) is described by Paul: "All have sinned and come short of the glory of God" (Romans 3:23). The glory of God seen in man at creation has been obscured. Since man is still man, and man was made in the image of God, it is clear that he must still show something of that image. Man still displays God's image, but God's glory does not shine through him. In contrast, says the same writer, the redeemed have that glory restored (2 Corinthians 3:18).

That fallen man still bears the image of God is apparent from our earlier reference to murder. The statement, that this is wrong because man is made in God's image, was made after the Fall. "This distinction is vital: the image of God remains in us after the Fall, though we no longer reflect God's perfect moral character" (Macaulay and Barrs, p.17).

What then was the effect of the Fall with respect to man being in the image of God? Man became dead spiritually but sin also affected other aspects of his human-ness. Man is still an image-bearer, but it is a perverted or distorted image (Hoekema, p. 72). It is like a mirror, to take Paul's analogy, which has been cracked and gives a faulty reflection. This does not detach man from moral realities and responsibilities (Henry, p. 150).

The Fall affected, for example, man's ability to choose (often miscalled "free will"). Being in God's image, man **can** choose, but, being in sin, what does he **want** to choose? As Calvin puts it (II, 2:7), "Man will be said to profess free will in this sense . . . he does evil voluntarily, and not by constraint."

Redemption frees us from the bondage of sin

A.5 The Restoration of the Image

That image which was spoiled at the Fall is restored in the Regeneration. We had "fallen short of the glory of God" (Romans 3:23), but the work of God's spirit in us is so that "we . . ., beholding as in a glass the glory of the Lord, are changed **into the same image** from glory to glory as by the Spirit of the Lord" (2. Cor. 3:18). The Greek word for "changed" can also be translated "transfigured" (and will remind us of Matthew 17). It is the word *metamorphoo*; we are metamorphosed!

What is the effect? To the Colossians, Paul says that the effect of the new man is the "renewal of knowledge after the image of Him that created him" (3:10). We lost our knowledge of God and things spiritual; this is renewed in our regeneration. "Not merely intellectual knowledge . . . a true apprehension of God" (Machen, p. 150).

Not only that, but, he says in the parallel letter to the Ephesians (4:24), the new man "is created in righteousness and true holiness" after the nature of God. A moral likeness to God. Who can doubt that these are characteristics of God and were lost by man at the Fall?

This is God's best plan for His chosen people. Many quote Romans 8:28 that "all things work together for good to them that love God." But, what is that good? The next verse tells us, "For . . He also did predestinate us to be conformed to the image of His Son." All that we experience is working to that good. To be made like His Son.

Of course, there is a conflict between the 'old man' (spoilt by sin) and the 'new man' (created in Christ). Hoekema (p. 24-8, 88-89) points out that "The thought that Christians need continually to grow in being conformed to the image of God is also found in two New Testament passages that speak of putting off the 'old man' and putting on the 'new man'."

It is re-perfected in glorification. At that time, not only will we have received the renewal of our spiritual aspect of the image, but we will receive a glorified body. The body is destined to become a spiritual body. This is explained by Berkhof (p. 205) as "a body which is completely spirit-controlled, a perfect instrument of the soul."

Features of the "Imago Dei"

B.1 Resemblance to God

In the soul of man, the image of God is displayed in such qualities as spirituality, invisibility and immortality (Berkhof, p. 207). So, man's soul is not merely a complex of biochemical functions, but interacts with the eternal and will still when the temporal has passed away. But, through his body, man displays other features of this image.

God is holy and so must we be. Both through the Levitical system (Lev. 19:2) and the New Covenant (1 Peter 1:16), we are required to be holy. This means that we are to show God's image in this world. An image distinctive and separate from that dominated by sin.

Packer (p. 12) has emphasised that "God's image must be thought of not just as something static and given . . . but also as a condition which is more or less achieved according to how I use my God-given capacities." Having seen how Scripture identifies aspects of the nature of this image, we now need to determine how this is to be worked out in our daily living.

Quoting Packer again (p. 12) "The fulfilment of the image . . . consists of actual rationality, creativity, mastery of the environment, righteousness and community."

The image of God is displayed in the intellectual and moral integrity of man's nature shown, as demonstrated above, in knowledge, righteousness and holiness. This is summed up in the Shorter Catechism: "God created man, male and female, after His own image in knowledge, righteousness and holiness, with dominion over the creatures."

Berkhof comments (p. 207) on those distinctives which man cannot lose without ceasing to be man and the ethical qualities of the soul and its powers which man can lose without losing his human-ness. He says, "The image of God in this restricted sense is identical with what is called original righteousness. It is the moral perfection of the image, which could be, and was, lost by sin."

B.2 Harmony with God

It establishes man's capacity for fellowship with God. You cannot have full empathy *without some commonality.* Man, in his perfection, has an ability to discern the will of God and the duties required of him. Man has this restored (Romans 12:2) in the "new man." What is this perfect will of God for man?

God is good and we should both have the desire to be good and possess an appreciation of what is good. This is marked by the features listed in Philippians 4:8 – true, just, pure, lovely, gracious, virtuous and praiseworthy.

Surely, this must be that we show "the fruit of the Spirit" (Galatians 5:22-23). The context of these verses shows the contrast is with the "works of the flesh" which will disbar the unbeliever from the kingdom of God (v. 21). But the person who has died to that life and has been resurrected in Christ (v. 24) will live a life of marked contrast.

Man has a conscience. Though man, in general, displays a damaged and insensitive conscience (1 Timothy 4:2), it is a feature of man around the world, in different cultures, that he displays a conscience rather than an instinct. "Conscience . . . reminds us of what we owe to God, points out the distinction between good and evil, and thereby convicts us of departure from duty" (Calvin, II, 8:1).

Besides man's intellectual and moral integrity, Berkhof (p. 207) identifies his psychical powers or faculties as a rational and moral being: his intellect, his will and their functions. Man has a "rational capacity to rise above the mere impressions of sensation and pursue an intelligent purpose in life" (Henry, p. 152).

Man also has a gift of intelligence and a power to reason and make plans; he has a gift of rationality. Packer (p. 31) points out that "man could not know, love or serve God without this endowment of reason with which to apprehend Him." You are displaying this as you read this paper and ask how you should respond to Him.

In this, of course, we see again man's distinction from the animal kingdom. "Only he has . . . the forms of reason and morality. Only he is given a distinctive content of knowledge." So, "He cannot escape ethical responsibility" (Henry, p. 151). Similarly, Packer (p. 12) writes that "the given capacities . . . are powers of thought, of construction, of management, of moral discernment and of relating responsively to other rational beings."

Then we see the image of God showing itself in man's creativity. God's resolve concerning our identity is made in the context of His own creativity: "Let us make man in our image." We see it revealed in art and design. Calvin refers to artistic and scientific gifts: "These virtues – or rather images of virtues – are gifts of God" (Hoekema, p. 189-190).

"Intellect and reason . . . philosophy . . . music . . . arts and sciences . . . the state . . . (the) desire for truth and virtue . . . natural love" (Hoekema, p. 190-1) are marks of God's image in man. They are spoilt by sin, but "common grace" restrains the complete corruption of these by sin. There is much in these areas that we can appreciate and thank God for. However, in each case, we are conscious of the potential of sin to ruin them.

B.3 Agents of God

Another mark of man's rationality is found in his obedience. Righteousness is "doing God's revealed will, so that our lives embody His moral preferences and make for His pleasure" (Packer, p. 15). For us to love God, we must have a will to give a response of love. That response is obedience (John 14:15). We can obey because we have a will; we do obey because we love Him.

Another feature of the image of God is authority. God is King; we must exercise dominion (BCS, 2.3.3). At the creation of man, God said, "Let them have dominion . . ." (Genesis 1:26). Describing the uniqueness of man in God's creation, the Psalmist says, "Thou hast put all things under his feet" (Psalm 8:6). Man is given a commission to master the world, to explore its potentialities, etc. But, as we have noted earlier, only with a responsibility before God.

God is love and we are to reflect it (BCS, 2.3.2.4; 1 John 4:8). Kitwood (p. 96) noted that "The creation was an overflowing of His love." Love means self-giving. Aside from its implication for our understanding of creation, this thought has deep implications for man as man. There was no common word for this kind of love, so the Christians took the Greek word *agape* and gave it a new meaning. This love will show its response to God and man, as Christ showed in His summary of the commandments (Matthew 22:36-40).

"Community" is "togetherness." It again reflects the nature of God. He said, "Let us make man . . ." A distinctive tenet of orthodox Christianity is a belief in the Trinity – a community of three Persons in one God. The love They have is to be reflected in us. (Compare with Christ's prayer in John 17:21). This community relationship is reflected in friendship (cf. David and Jonathan), in marriage (Genesis 2:18) , in the family (Luke 2:51) and in the church (Ephesians 3:15). We must never forget that this is God's plan for man. Any attempt, for example, to weaken the family bond or break the unity of His church will suffer His displeasure.

This togetherness requires communication. God is the Word; we show His image in communication (BCS, 2.3.2.1). Communication demonstrates itself in many ways: in body language and speech, in song and poetry, etc. Again, these combine to mark man out as distinctive in creation. But, just as God is truth, so we must communicate in truth (Exodus 20:16; Ephesians 4:15) and in worship (Ephesians 5:19-20).

C. Implications of the "Imago Dei"

C.1 To the Inner Life

After what we have seen from Scripture, surely it is clear that this is to be the organising principle of the Christian's life. Man is not free to do whatever he likes. We are controlled positively as well as negatively by those things which are consistent with God's image in man. As Macaulay and Barrs have said (p. 18), "This is an invaluable asset in the culture in which we live, for people now recognize that they are unable to define life, that, beginning only with ourselves and excluding revelation from God, it is intellectually invalid for finite beings to speak with certainty about truth."

It should affect the way we think. Harry Blamires contrasts thinking Christianly with thinking secularly and shows that they lead us along different paths. Too often, he says, the church is squeezed by the mould of the world's thinking instead of transforming it as salt and light (Romans 12:1-2; Matthew 5:13-16).

It means too that life has meaning and purpose. Love and service become our watchwords. Commitment determines our way of life. We seek to know God's will for our lives, and those of others. It is not a pointless, vicious circle.

Because he is made in God's image, man cannot escape ethical responsibility. We are required to be holy, just, loving and display the fruit of God's Spirit.

C.2 To Creation

We have seen that man has dominion but he also has responsibility. So, it leads to a proper rule and care for God's creation. "Rule" in God's vocabulary implies love and responsibility, not tyranny and fear. "He is now empowered to exercise dominion over the earth and over nature in a responsible, obedient, and unselfish way. This means that man is now enabled to look upon himself as a steward of the earth and all that is in it, rather than an overlord with absolute and arbitrary power" (Hoekema, p. 88). As this writer goes on to emphasise, conservation and preservation are a part of this mandate.

Advancement of research etc. will be done in such a way as to honour God's commands and give Him the praise.

C.3 To Fellow Creatures

When we consider our attitude to fellow man, the concept of him being the image of God has a balancing effect. "Such definition stands verbal guard against both the naturalistic animalization and the idealistic divinization of man" (Henry, p. 148). We see man as he really is. A Biblical attitude to man is realistic.

Since man is made in the image of God, we are aware of the sanctity of life. The command against murder is based on the fact that even fallen man is in the image of God (Genesis 9:6). So, Christians have to oppose as strenuously as any the attempted annihilation of the Jews, the abortion of live foetuses, infanticide and euthanasia as well as all other forms of murder or irresponsible takings of life.

We might ask questions too about some scientific (?medical) research which involves work on living embryos or transplants from animals to humans. These are complex areas, beyond the scope of this article, but clearly of significance to our theme.

We will examine how we live and treat others. Christ speaks strongly about the misuse of the tongue. A mark of God's image in man is his ability to communicate. How Satan can take that organ and set it on fire by hell (James 3:6)! But, we are to beware of how we speak to and of others, because they are made in God's likeness (James 3:9). What was that you said about that man or woman yesterday?

So, we love our fellow man. If he is in the image of God, then we cannot love God and hate man (1 John 4:11 etc.). It is illogical. It is impossible.

But the Scriptures work this out in a very real way. It affects the relationship of man and woman to each other. This reflects the relationship of man and God (1 Cor. 1:7; Eph. 5:24-25). The marks are love and service. Love that will cause a man to sacrifice his life for his wife. Love that will cause a woman to serve her husband. This is not the attitude of the non-Christian society. Self-protection is a better description of its code.

C.4 To "Survival of the Fittest"

Then, we should see in the Christian a concern for the vulnerable and the weak. The dominant attitude of "the world" is that they should "stand on their own feet." Certainly the Scriptures encourage work and recognize a real reward for labour. But they also have a deep concern for the protection of those not able, for whatever reason. Compare, for example, Ephesians 4:28; Deuteronomy 24:19; 25:5; Leviticus 25:10, 13-17. It does not appeal to the modern economy-based society! Psalms 82 and 146:7-9 declare the Lord's will in this matter.

But what of the handicapped? We talk of the "quality of life" and measure that by what the able-bodied can do. The handicapped are not "second class citizens." They are made in the image of God. Their physical or mental handicaps are reflections of the effect of sin which has given us all a spiritual handicap. We are not to despise the one who has not the ability or desire to run a company. We are not to despise the one who cannot walk or cannot write. Is the removal of an arm or leg a removal of God's image? Is a disfigurement of the face or a twisting of the spine an obliteration of the divine image in man? The loss of a part of the brain does not cause God to be dismissed from the person.

Often we mistake our inability to understand a person to mean they cannot communicate. A speech defect is often overcome now by mechanical means. We also tend to assume that because a person cannot communicate because of physical deficiency, that they cannot receive messages. How many have lived in torment as they have heard cruel dismissals of them while they have longed to be able to respond? This was typified recently when a spastic wrote poetry dramatically portraying how he had felt in such circumstances. Many more examples could be given.

One difficult case is that of anencephaly – a physical disability in which there is no brain. As a result, the foetal swallowing reflex is absent and the child normally lives for only a few seconds. However, in the absence of divine knowledge, we must assume that such a child is still a person. How much brain must be present to contribute to human-hood? Can we accept that the spiritual dimension, which outlives the body, is resident in a physical brain?

It is obviously right that Christians are taking a prominent role in caring for the mentally handicapped (e.g. through "Cause for Concern"). This is not a shutting away of social nuisances, but rather a loving and caring development of real people.

Finally (for this paper, which is not intended to be an exhaustive treatment of this subject), we believe that a consequence of our belief in man as made in the image of God will be a spur to evangelism (Hoekema, p. 98). Because of it, we must love each person and seek to do him or her good. As we have seen, the ultimate good (Romans 8:28-29) is that he or she should be conformed to the image of God's Son.

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(continued from Page 7)

shrew-like mammals fed on vulnerable dinosaur eggs that were unprotected by the parents. However, this view does not account for the fact that the majority of modern reptiles that flourish today lay eggs and do not care for them (some do brood or roll the eggs occasionally, and a few retain them inside the oviducts until they are hatched). Alternative theories are based on the indirect effects of climate through their influence on the plant life. A reduction in the relative abundance of lush plants such as ferns and cycads would have reduced the feeding grounds for the herbivores and in turn for the carnivores that preyed upon them. However, it is clear that at least some groups of dinosaurs, the Hadrosaurs, fed on plant material rich in silicas such as grasslands and they may have lived on open savannah lands similar to those covering large areas of Africa today.

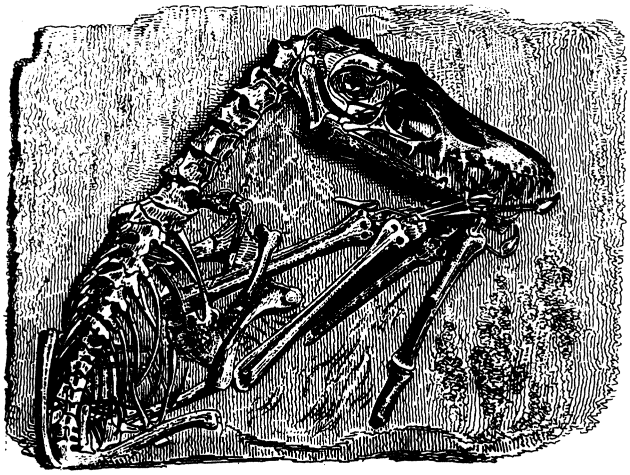
Crocodiles and alligators possess a temperature sensitive mechanism which determines the sex of their young (Deeming and Ferguson, 1989). An example of this is the American alligator. When the eggs of this reptile are incubated at 30°C, the young are all female, but at 33°C all the hatchlings are male. Intermediate temperatures result in varying proportions of the two sexes. This feature may enable alligator populations to recover rapidly when numbers are reduced suddenly by a disaster, as the selection of sites at certain temperatures would mean that a greater proportion of the offspring would be female. It has been suggested by Deeming and Ferguson (1989) that the sex of dinosaur offspring was determined genetically, as in the case of mammals, which are considered to be more advanced in evolutionary terms. Without the temperature-sensitive mechanism present in other reptiles, the dinosaurs were thought to have been unable to adapt sufficiently rapidly to the climatic changes at the end of the Cretaceous period to have avoided extinction. This theory requires that mammals had not yet evolved, because presumably they would have been as vulnerable to climatic changes as the dinosaurs. This theory would therefore not be acceptable to creationists, who hold that dinosaurs and mammals could be found on the earth together from the beginning.

The evolutionary interpretations of observations relating to the extinction of dinosaurs are made in the light of certain presuppositions, whether of gradual evolutionary progression or a series of brief episodes of rapid evolutionary change and extinction punctuating relatively stable epochs.

The Biblical Account

The Biblical account of earth history was primarily written to describe God's dealings with man, but the details show that there were periods of stability and in particular one of catastrophic instability including and following the world-wide flood in the time of Noah. As a result of this event, the various plant and animal communities originally created would have been destroyed. We are told in the Genesis account that all the various kinds of land animals were preserved in the ark and they then repopulated the earth after the flood. This would have included the dinosaurs. However, it would have been a very different place from the earth before the flood, as the original soil and vegetation, including forests and grasslands on which herbivorous dinosaurs fed, would have been destroyed. Also, we should not underestimate the long term consequences of the flood on the earth, likely effects being mountain building activity, changes in the sea level and also in the climate. It is reasonable to conclude that such changes in the climate and also in the vegetation in the centuries following the repopulation of the earth were responsible for the extinction of the dinosaurs. The detailed nature of the causes and timing of these events remain open for further scientific research.

The Biblical account provides us with a general framework to understand the extinction of the dinosaurs. These are the changes in the natural world as a consequence of man's rebellion against God (Genesis 3), in particular the extensive changes as a consequence of the worldwide flood. Man and dinosaurs would have walked the earth at the same time. However, it must be stated that the famous Taylor Trackway, which was thought to include human footprints and those of three-toed dinosaur has been withdrawn as scientific evidence. Subsequent to the early investigations, it has been found that the trackways attributed to human feet were poorly formed prints also from a three-toed dinosaur. Surface stains that developed around the original imprints showed that these were clearly not impressions made by human feet (Morris, 1986).



In Conclusion

In conclusion, dinosaurs were a group of varied and complex reptiles as dominant and successful in the past as mammals are today, occupying a range of habitats from open savannah grasslands to forested areas, some herbivorous and some carnivorous. They range in size from *Mussaurus*, which was no bigger than a thrush, to *Brachiosaurus* which weighed more than 80 tonnes and was as much as 30 m in length. Each group of dinosaurs was distinct with no evidence of evolutionary progression. The image of inferior, slow-plodding and dim-witted animals, poorly adapted to their environment is clearly wrong. Some were very specialised, their skeletons show evidence of design, with teeth, bone shape and armour clearly well suited for various particular purposes such as the grinding of very coarse plant material. Was the creation of the dinosaurs a mistake that had to be rectified at a later stage, or was the loss of dinosaurs from the earth a mistake? The Bible clearly teaches that the mistake was a human one. The original creation was in perfect order. Man's rebellion against God had enormous consequences, which included changes in the natural world and the demise of these great beasts. Maybe this helps to put man's rebellion in a better perspective.

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Religious Presuppositions in Historical Geology

David J. Tyler

James Hutton is reputed to be the first British geologist to have abandoned the Mosaic Chronology, and one of the first to have adopted a long timescale for Earth history. His methodology, observations and deductions have earned him the title "The Founder of Modern Geology". This article attempts to identify philosophical and religious factors in Hutton's thinking and is also intended to help clarify issues relevant to the contemporary debate about origins.

1. Christian and Naturalistic Worldviews

Philosophical enquiry after the Renaissance examined the phenomena of rationality and how 'thinking man' can arrive at truth and understanding. Brief sketches of major thinkers are found in Brown[1]. The continental philosophers focussed their attention upon supposedly self-evident truths, and sought to construct comprehensive world-views based on reason. In Britain the emphasis was different; interest in empiricism was led by Locke (1632-1704), Berkeley (1685-1753) and Hulme (1711-1776). These men argued that all knowledge is ultimately derived experientially – the validity of assertions can only be established by testing them in experience.

A very helpful analyst of philosophical trends was Francis Schaeffer, particularly in his books *Escape from Reason*[2] and *The God Who is There*[3]. He points out that the Renaissance problem of 'nature and grace' is no problem for the Christian. There is no necessity to compartmentalise knowledge because, by revelation, God unifies all knowledge. This truth was rediscovered at the Reformation.

> "This did not mean that there was no freedom for art or science. It was quite the opposite; there was now possible true freedom within the revealed form. But, though art and science have freedom, they are not autonomous – the artist and the scientist are also under the revelation of the Scriptures. As we shall see, whenever art or science has tried to be autonomous, a certain principle has always manifested itself – nature 'eats up' grace, and thus art and science themselves soon began to be meaningless" (ref. 2, p.23 - 24).

Subsequent to the Reformation, students of philosophy are largely following the struggles of men who, having ignored or denied revelation because of their commitment to human autonomy, still sought to unify knowledge. The continental Rationalists rejected the concept of revelation *in toto*. They wrestled with the problem of bringing the natural world into a relationship with innate concepts of human freedom and dignity – but instead of unity they found conflict and tension.

> "They feel the pressure 'downstairs' of man as the machine. Naturalistic science becomes a very heavy weight – an enemy. Freedom is beginning to be lost. So men, who are not really modern as yet and so have not accepted the fact that they are only machines, begin to hate science. They long for freedom even if the freedom makes no sense, and thus autonomous freedom and the autonomous machine stand facing each other" (ref. 2, p.34).

Schaeffer then goes on to trace these intellectual trends through Hegel and the 'line of despair', and so on to the modern period. Hegel is the turning point because he, at last, acknowledged that the quest for a unified field of knowledge was doomed to failure. He launched out in a new direction – one that required the sacrifice of rationality.

> "It is true that Hegel is usually classified as an idealist. He hoped for a synthesis which would have some relationship to reasonableness somehow. Nevertheless he opened the door to that which is characteristic of modern man. Truth as truth is gone, and synthesis (the both-and), with its relativism reigns.
> The basic position of man in rebellion against God is that man is at the centre of the universe, that he is autonomous – here lies his rebellion. Man will keep his rationalism and his rebellion, his insistence on total autonomy or partially autonomous areas, even if it means he must give up his rationality" (ref. 2, p.41, 42).

The Empiricists shared the post-Renaissance commitment to autonomous man, and indifference to or rejection of revelation. Their emphasis on knowledge gained through the senses is one which took them far from the Christian Way. Although some of the empiricists were professing Christians, they had imbibed a non-Christian philosophy.

> "The movement is generally thought of as having made a great contribution to the general advance of modern agnosticism. For when Hulme pushed empiricist techniques to their logical conclusions, he left no alternative to scepticism" (ref. 1, p.61).

James Hutton (1726 - 1797) belonged to the Empiricist tradition, as is shown in Section 2. Whereas his geological colleagues sought, to some extent, to integrate their studies of the Earth with Biblical revelation, Hutton made it a principle to verify all statements about the past exclusively by reference to experientially-derived knowledge.

2. Hutton's *Principles of Knowledge*

Although chiefly remembered for his contributions to physical geology and explanations of the Earth's workings, Hutton's interests were diverse. Being of an amiable disposition, he found many friends amongst the literary and scientific society in Edinburgh, and greatly enjoyed the interchange of ideas. Towards the end of his life, in 1794, Hutton published the first of his two major works[4], popularly called his *Principles of Knowledge.* The Empiricist tradition is apparent in Hutton's discussion of the experimental sciences and of geology. The acquisition of knowledge, says Hutton, begins with sensation, or sense perception. The physical experience is discerned in the mind and analysed. Observations are followed by inferences – involving comparisons with previous observations and conclusions which are confirmed by reference to "the actual state or appearance of things" – the ultimate foundation of knowledge.

In a very helpful article[5], O'Rourke shows that Hutton was undoubtedly an Empiricist – but one whose independent mind developed his own version of Empiricism.

> "Hutton's account of the thought process might be summarised as follows. The three basic stages are sensation, perception (or apperception), and conception. In sensation the mind receives a stimulus from an external agent through the five senses. In perception the mind acts to compare sensations and organise them into objects. In conception, general ideas such as time, space, and motion are abstracted from the comparison of perceptions, then reapplied, in a reciprocal phase of the process, allowing them to be confirmed in sensation. Conceptual knowledge as it is used in science attains wide generality and precise refinement, but it is remote from experience and is only "relative" in the literal sense of dealing with relations, whereas sensations are "absolute" in the literal sense that they cannot be analysed. Hutton differs from earlier empiricists in assigning a greater role to the operation of the mind in creating knowledge. In this he resembles Kant, whose reasoning was, however, entirely *a priori*......
> An eighteenth-century reader who understood Hutton's philosophy would know what to expect from his geology. Field experience would be stressed as both the source of information and its criterion. Observation would be separated carefully from inference. Statements about the past would have to be phrased in terms of present processes. Hutton's search for principles led him to see that there can be no direct knowledge of them, and since principle means literally beginning, he can be expected to doubt cosmogony" (p.11).

There has been a tendency among geologists who have regarded Hutton as a father-figure to assert that the *Theory of the Earth* was written in the field. This assessment seems to seriously undervalue Hutton's detailed and contemperaneous work on the philosophy of knowledge. Nevertheless, the neglect of Hutton's non-geological writing is understandable as he did not even mention his own philosophic work in the *Theory of the Earth*! O'Rourke's explanation of this situation, outlined in Section 3 is both unexpected and provocative. The interpretation of Hutton as a devotee of fieldwork and inductive science is ably exploded by Gould[12].

3. Hutton's *Theory of the Earth*

Throughout Hutton's geological volumes[6], one is conscious of teleology: the "argument from design". The basic concept is that the Earth is a world ordered by the Divine Being to be a home for man and the animals. Whilst a superficial glance might suggest that the 'home' is being destroyed by erosion of the land, this is not the case. The decay of rocks maintains the fertility of the soil, allowing life to continue. As land is destroyed in one place, it is regenerated in another. This is the rock cycle – well known now to students of geology. As the cycle continues, life persists, and the design of the Deity is fulfilled[7].

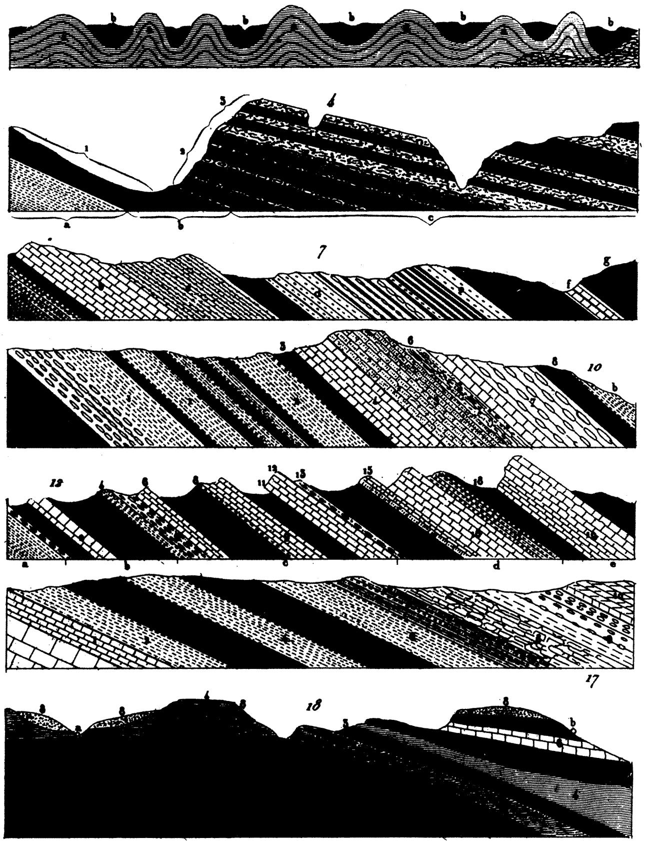
Hutton has traditionally been interpreted as a scholar working out his deistic views. Thus: "Hutton's theory is an almost perfect geological expression of deistic beliefs."[8]

The argument from design is "the basic premise from which the entire Huttonian theory stems."[9] O'Rourke states that deism was pervasive amongst the intellectuals of Hutton's day, and suggests that these people may well have influenced him (ref. 5, p.6).

The unexpected aspect of this situation is that the philosophical base of Empiricism is dramatically obscured by Deism.

> "The reader who started with the explanation of the Earth's operations would never guess that the same author had made an exhaustive analysis of its concepts, so thoroughly is the real argument masked by the teleology. The use of the new theory of knowledge can be seen, however, by referring to what he said about each topic – geologic process, uniformity, time, the primeval crust, and cosmogony – to the premise that knowledge begins with experience" (ref. 5, p.11,12).

The fascinating question is: why did Hutton choose to present his ideas on physical geology in this teleological way – when he had worked them out using an empiricist approach?



It is quite possible that there is a link between Hutton's Deism and his particular version of empiricism. This is explored below. However, it is also possible that Hutton was conscious of a public resistance, not only to his geological views, but also to his Empiricism. That Empiricism was greatly overshadowed by Deism is indicated by Brown[1]:

> "And if to many students Empiricism was *the* philosophy of the eighteenth century, it was not so to much of those who lived in that age. Among the various philosophies that clamoured for attention (and indeed got it) was Deism" (p. 74).

Consequently, Hutton may well have couched his arguments in a teleological form to gain a wider and more sympathetic readership. This is, in fact, the explanation suggested by O'Rourke. In the following quotation, he summarises Hutton's philosophical contribution and the dilemma which he faced.

> "The problem in geology is then how we can claim any knowledge of a past never experienced. Hutton was able to take a new approach because he modified empiricism to emphasise the active role of the mind in organising sense data. The world is as we conceive it, and we can conceive of similar experience reaching back indefinitely. We should begin geology with the study of the earth's operations as they are seen today. Much can be inferred from the terrain and its rocks, but such reasoning from effect to cause must also be verified in terms of present processes. Like Kant and the American pragmatists, Hutton required that any concept be confirmed in sense perception. Separating observation and inference at each step in the thought process, he arrived at a cause that cannot be observed, only inferred. Thus he avoided the fruitless speculations of earlier geologists and found many things they had overlooked, because his method disclosed what is and is not within reach. Yet he apparently felt that he could not expound a radically new philosophy in a geological treatise that was in itself too novel. So, he dressed the theory in a teleology that was already out of fashion" (ref. 5, p.19).

Whilst these thoughts would help to explain a decision to play down essentialism, the writer remains unconvinced that they are entirely adequate. Hutton employs Deistic thinking in a way which adds up to rather more than a veneer to camouflage the philosophy. It is suggested here that Hutton's "new approach" was only possible because of his Deistic beliefs. The universe was regarded as an elaborate mechanism that had been set in motion by the Deity and left to run. Evidences of design are to be found everywhere – as is also the case whenever one studies a man-made machine. The mechanism functions according to rules (laws) and its orderly behaviour is itself an expression of the purpose of the designer. The concept of an unchanging natural order and the predictability of the universe must follow from Deistic presuppositions.

How then is Hutton able to justify the use of present experience to interpret past events? Observations and experiences allow the mind to identify order, and so to identify the divine principles which govern all physical and chemical processes taking place in the universe. (Yet, since "order is in thought, not thing" (ref. 5, p.14), it is necessary for students of nature to show humility. They must distinguish between their perceptions of order, and that which is actually ordained by the Deity.) Access to the geological past is gained by taking the principles of order discovered by a study of present-day processes and assuming, *on the basis of continuity of divine government,* that these principles have always been in operation. Thus, one arrives at the dictum, "The present is the key to the past." Philosophically, Hutton would state that any assertion about the past must be verified in terms of present processes. The issue is not uniformity of geologic processes in the Lyellian sense, but whether anything can be known about the past except from the perspective of the present.

Hutton's populariser, John Playfair, omitted the teleology when he redrafted the ideas of his mentor for the public[10]. Since Deism had waned towards the end of the eighteenth century, Playfair's work was much more acceptable to the succeeding generation of geologists and its impact was enduring. However, the justification of "the present is the key to the past" could no longer make reference to Deism. The question, which was never satisfactorily answered, becomes: what replaces Deism to justify Hutton's methodology?

Charles Lyell sought to establish Hutton as an inductive scientist but was not willing to appeal to Deistic views to justify the continuity of present-day processes with those of the past. Instead, he introduced a confusion of 'natural-law' with 'uniformity of rate' and declared uniformity of geologic processes to be the only tenable scientific position. This myth has affected generations of geologists and the incisive analysis and powerful criticisms of Gould[12] are long overdue. Consequently, since the principle of uniformity of geologic processes can no longer be regarded as scientific, Hutton's methodology still lacks a rationale.

4. The Way Forward

The disciple of Christ is commanded to love God with all his heart, soul, mind and strength and to love his neighbour as himself. It is necessary, therefore, for a Christian to be a transformed person: in ethics and morality, in life-style, and in world-view. As was pointed out in Section 1, a unified view is possible because the Lord is not only the Creator of all things, but also the Revealer of truth to man. Christians who are scientists have an obligation to address questions of methodology so that they are consciously Christian in their thinking. (A popular presentation of this subject by the writer[11] has sought to stimulate thought along these lines).

A methodology for Christian thinking in the geological sciences is in great need of clarification. There appear to be many Christians who regard the Huttonian principles as quite acceptable – and some may even wish to revive his teleological arguments. However, this article has sought to show that such an approach is fundamentally in error. Hutton's methodology derives from a blend of Empiricism and Deism – which are both hostile to the Christian world-view. Both deny revelation; both consider man as autonomous (an important aspect of man's rebellion against God); and Deism has a defective understanding of God's activity in creation and providence. Our desire to see a genuinely Christian understanding of earth history and origins needs to be accompanied by a genuinely Christian methodology for the earth sciences.

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Reviews & Reports

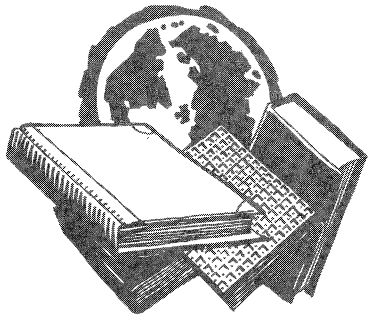
BCS at Keswick

The Lake District was hot and dry this year when BCS visited Keswick for 'Leaders Week' at the Convention. Four of our members manned the BCS display, Sheena Eisaks and David Tyler during the first part of the week and then Rachel Matthews and Roydon Bolton. There was a constant trickle of visitors to the stand. Some were Christians who were enquiring for help on the subject of creation for when they spoke to non-Christian friends and family members and others were interested non-Christians who had many questions, some very technical. The wide spectrum of ages and backgrounds of those who came was encouraging and included students, pastors, retired folk, and a local hotelier. Many had not heard of the society before, although some had read 'Bone of Contention' by Sylvia Baker.

Free leaflets were taken from the stand and some booklets bought. In general reactions were favourable, although one opinion expressed was that the BCS publications were "high tec and above the heads of us peasants." (Any comments, readers? Ed). The exhibition included photographs and comments on the eye of the human and also that of the fossil trilobites (classified with the wood lice that are so common today). The complexity of these eyes was described and with it the clear implication that they were not the result of chance mutations but were God's design and handiwork.

There was also the 'Great Fossil Puzzle' which attracted attention mainly from children, to whom it was totally unintelligible. Even biology students were unable to identify it. Consolation prizes were awarded to two young girls of 8 for their fruitlessly pestering over the exhibit. Maybe next year you will visit one of our displays and have a go . . . . . , or we should ask the originator of this problem to explain the mystery in a future issue of **Origins!**

We hope that this exhibition at Keswick will have further stimulated interest and questioning on the subject of origins. Thank you to those members who prepared, transported and manned the stands and also helped compile this report. Perhaps next year you would like to be involved in a similar opportunity, or maybe you would like to use the display as part of a meeting on creation in your church. Do write and let us know!



Creation and Evolution: the Facts and the Fallacies

by Alan Hayward

SPCK, London, 1985, 232pp £2.75

Reviewed by D.C.C. Watson

This is an interesting little book by a physicist who calls himself a "Bible-believing ancient-creationist" and tries to prove that both theistic evolution and 'recent creationism' are wrong. It is divided into three parts:

1. The genuine scientific objections to Darwinism.
2. The age of the earth.
3. Bible teaching on creation.

Writing primarily for the layman, Dr Hayward is easy to read and keeps his chapters short. Documentation is good and notes at the back elaborate important points.

With part 1 the reviewer has no quarrel: Hayward has little difficulty in showing the confusion in the ranks of neo-Darwinians faced with ever-increasing evidences against 'mega-evolution'. Useful extracts are made from Grasse, Willis Hitching, G. R. Taylor and other 'doubters'. Part 2 comprises half the book and carries the main thrust of the argument; the contention that the earth is indeed millions of years old. Those familiar with the writings of D. E. Wonderley and Davis A. Young will find little new here. As a non-scientist, the reviewer will not attempt to evaluate Hayward's critique of the young earth model, but it is noticeable that he refers only twice to articles from Creation Research Society Quarterly. One would have expected some reference to John Woodmorappe's studies in geology and radiometric dating.

In part 3, Hayward follows the well-worn path of attempting to prove that Genesis 1 does not mean what it says. Not a single eminent Hebrew scholar is quoted in support of his interpretation and the traditional interpretation is dismissed 'with a wave of the hand' because "Luther misunderstood Joshua's Long Day". Perhaps the best epitaph on all such theories has been written by Professor James Barr:

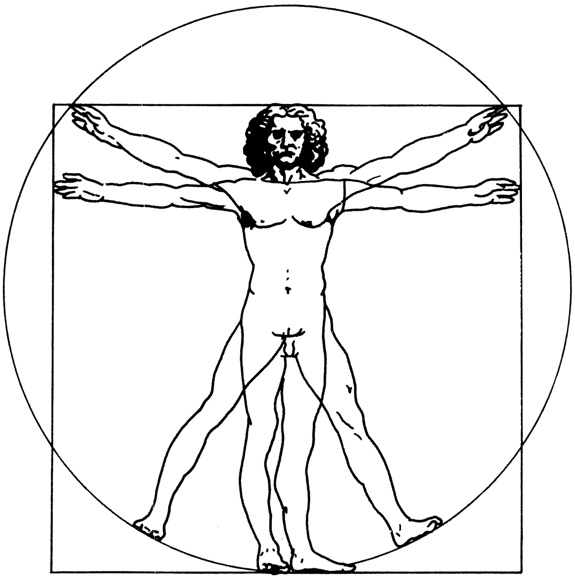
> "By completely ignoring the literary form of the passage, its emphasis upon the seven-day scheme and all questions involving the intentions of the writers, this interpretation is as effective a denial of the truth of Genesis as any atheist writer could produce . . . . . These are all transparent devices for making the Bible appear to be factually accurate by altering its meaning at the awkward points" (Escaping from Fundamentalism, 1984, p137).

The Amazing Human Body
by Mark P. Cosgrove
Baker Book House, 1987, 202pp $7.95
Reviewed by Sylvia Baker

In this well-written and at times amusing book, a Christian psychologist explores the human body from a fascinating perspective. Mark Cosgrove, professor and chairman of the Psychology Department at Taylor University is concerned to show that the human body is specially designed for "personhood." In other words, the very structure of the human body demonstrates that humans are quite different from animals and designed for quite a different purpose.

Conditioned as we have been by evolutionary descriptions of Biology, this approach comes as a surprise. Those of us who have rejected an evolutionary view of origins maintain strongly that man's creation was special, and yet subconciously we probably think the human body as that of an advanced ape. Mark Cosgrove demonstrates just how wide is the gulf between man and his nearest supposed evolutionary relative, let alone the rest of the animal kingdom. Whether we are considering human faces, skin, sex, childhood development, upright stance, mind or life span, all demonstrate that man is designed for something special, for a depth of relationship unknown to animals, both with other humans and with God.

We will need to practise this kind of thinking and this book will help us to begin to do so.



Evolution – the Great Debate
by Vernon Blackmore and Andrew Page
Lion, 1989, 192pp, £9.95
Reviewed by Sylvia Baker

This is a beautifully presented, extensively researched and well-written book, but it is fatally flawed. The writers give us an in-depth and very readable account of the great debate concerning evolution and of the personalities involved in it. Much of the factual material is interesting and informative. The flaw is in the theological position of the authors and the aim that lies behind what they have written.

Blackmore and Page are writing as convinced evolutionists. They would claim also to believe in the God of the Bible. That they should still wish to be evolutionists after writing this book is puzzling indeed, since it contains so much data which should at least throw grave doubts on that position. Having described some problems with Darwinism, the authors ask, "Are the scientists wrong? What can we believe?" They go on to assure us, "It is well to remember that scientists are in no doubt that evolution has occurred. But the mechanism by which evolution has occurred is in dispute." This statement does not seem to astonish them as it does me. In the 19th century, evolution swept the field because Darwin seemed to have found a mechanism that made it possible. As Blackmore and Page rightly point out, Darwin did not claim to have any proof that evolution had actually occurred. All he had was a possible mechanism. Now there is no longer an agreed mechanism. Neither has there been any advance on the "proof" front. *Why* then does evolution still hold the field?

The answer must surely be that evolution holds sway as a philosophy, a unifying idea, rather than as a science that is dependent on observed facts. Richard Dawkins, who is quoted extensively and fairly sympathetically in this book, sees this very clearly. In his book "The Blind Watchmaker" he has stated "Darwin made it possible to be an intellectually fulfilled atheist." Dawkins does not see how anyone could have been an atheist before 1859.

With the benefit of hindsight, we can see where Darwinism has led us – to a scientific establishment that is effectively and essentially atheistic, just as some at that time had predicted. Blackmore and Page need to face the impact of much that is in their own book. They need to face the fact that evolution is about atheism and that no-one claiming to love the God of the Bible should have anything to do with it.

Correspondence

Extracts of a letter from R. C. Bolton

In view of the specialist nature of the BCS testimony I wonder what audience we seek and how we can best attract it. Have we an evangelical thrust or do we just "feed the flock"? Would the preparation of a wide variety of short, cheap, low-tech leaflets with single pro-Biblical Creation/anti-evolution points PLUS a direct Gospel challenge meet the needs of secondary pupils and lay people – and perhaps supply to students potent bullets calculated to undermine the evolutionary stranglehold on education?

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